

#### ABSTRACT

A process for producing a vinyl-cis-polybutadiene rubber, including mixing (A) vinyl-cis-polybutadiene obtained by (1) a step of adding a cis-1,4-polymerization catalyst obtainable from an organoaluminum compound and a soluble cobalt compound to a mixture containing 1,3-butadiene and a hydrocarbon-based organic solvent as the major components and having an adjusted water content, thereby subjecting the 1,3-butadiene to cis-1,4-polymerization and subsequently, (2) a step of making a catalyst obtainable from a soluble cobalt compound, an organoaluminum compound represented by the general formula,  $AlR_3$  (wherein R represents an alkyl group having from 1 to 6 carbon atoms, a phenyl group, or a cycloalkyl group), and carbon disulfide present in the resulting polymerization reaction mixture, thereby subjecting the 1,3-butadiene to 1,2-polymerization; and (B) cis-polybutadiene obtained by a step of adding the foregoing cis-1,4-polymerization catalyst, thereby subjecting the 1,3-butadiene to cis-1,4-polymerization and a rubber composition containing the resulting rubber.